

**SAMPLE**  
NOT FOR SALE

*Electric  
Duet*

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© 1981 Paul Lutus

**insoft**<sup>®</sup>

10175 Barbur Blvd. / Suite 202B / Portland, OR 97219 / (503) 244-4181

**\*\* NOTICE \*\***

The Electric Duet is shipped on a double sided diskette. The reverse side is your backup. Should the diskette ever become damaged, simply return it with five dollars to cover shipping and handling to:

INSOFT  
10175 SW BARBUR BLVD. SUITE 202B  
PORTLAND, OR. 97219

for a prompt replacement.

Due to the diskette protection used on The Electric Duet, the screen will fill with inverse 'R's after saving a player module on your diskette (see page 14). This is normal and occurs only after the player has been correctly saved. Simply reboot your Electric Duet diskette to re-enter the program.

**\*\* CORRECTIONS \*\***

An enhancement was made to the Electric Duet to improve its sound quality and to simplify music entry. This was made possible by using a single duration value for both notes. Please insert the following changes into your Electric Duet manual.

Page 4 - In the last example, both durations should be "4.".

The last paragraph should state that durations for both notes are the same.

Page 8 - The first paragraph should read:

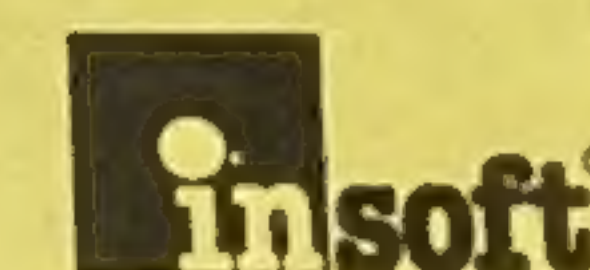
When you are changing durations, you need only enter one of the durations for both to be changed. This is because both notes use the same duration value.

Page 7 - In the last paragraph, the first references to ConTRoL-[R] and ConTRoL-[F] are reversed. ConTRoL-[R] will lengthen note durations, while ConTRoL-[F] will shorten them.

**-NOTICE-  
READ BEFORE USING**

If the Electric Duet Player module is incorporated into any program intended for sale or commercial use of any kind, the following message must be prominently displayed on the product's packaging.

The two voice music in this product was created using the Electric Duet Music Synthesizer by Paul Lutus.  
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*Electric  
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Apple II and II Plus  
16 Sector  
Apple III Emulation Mode  
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### Disclaimer of all Warranties and Liability

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## *Electric Duet*

### Introduction to The Electric Duet

The Electric Duet is the only music synthesizer program for the Apple ][ that plays two-part music without the need for add-on circuit boards. Two simultaneous musical parts (each with 4 instrument voices) are provided using an advanced digital music generating technique developed for this program. The music may be played through the Apple ][ built-in speaker, or you may connect the Apple to your stereo for room-filling sound. Because The Electric Duet needs no music generating circuit boards, it saves several hundred dollars in extra costs. Here are some of the features, from the simple to the advanced:

- (1) A "jukebox" is provided that allows you to play the provided musical library (or music you have added to the library). This is an excellent introduction to The Electric Duet.
- (2) A piano program is provided that allows you to play two-part music at the Apple ][ keyboard.
- (3) A music editor is provided that allows you to enter music by playing at the Apple ][ keyboard, edit, insert, combine parts, transpose, select instrument voices, and many other things, to simplify music entry.
- (4) After you have created some music, The Electric Duet allows you to include it in a BASIC (or other language) program by creating a portable "player" module that may be placed anywhere in the Apple ][ memory.

Each of these features is explained here. Items of particular importance are printed in boldface.

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## Electric Duet

like this:

0	8	,3G	8	,R
1	4	,4A#	4	,2G
2	8	,4C	8	,2G
3	4	,4D	4	,3A#
4	16	,4F	16	,3A#
5	16	,4D	16	,3A#
6	4	,4C	4	,3C
7	8	,4A	8	,3C
8	4	,3F	4	,2F

When you are making durations shorter, you need only enter one of the durations for both to be changed. This is because both notes share the same duration value, and the shortest entry is always selected. When you are making durations longer, both must be entered.

NOTE: Avoid using the upper half of the 5th octave in music entries. Some of the notes in this range are not accurate and should be used only for special effects.

### [S]aving a File

After you have entered and edited the previous example "Greensleeves", you may save it for future use. Press [S] for save, and enter a file name (Greensleeves should do) and, if you have more than one disk drive, a slot and drive for the file. You are permitted to put line numbers after the file name, to save a specific part of a file. These numbers are optional. For example:

GREENSLEEVES/0/8/

will save the file beginning at line 0 and ending at line 8.

NOTE: When you save a file using [S], or load using [L] (see below), the prefix "M." is automatically added to the file name. This identifies the file as music so (among other things) the jukebox can pick it out for playing.

### [T]ransposition

The [T]ranspose command is one of the most powerful editor commands. With it, you can speed up or slow down all or part of a musical file, change the key in which it is played, and do special kinds of editing.

In this example, we will speed up our short "Greensleeves" file (since the example entries deliberately made it too slow), then change its key.

## Electric Duet

Each entry to [T]ranspose includes a starting line number, an ending line number, a specifier telling [T]ranspose which part of the entry to change (Note 1 or 2 or Duration), and a number telling how far to move. Press [T], then make this entry:

(T)ranspose : /0/8/D1/2/

(press RETURN after the entry)

NOTE: Remember that both notes use the same duration value, so it doesn't matter whether you enter "D1" or "D2", both durations will change.

If you have made the entry correctly, the durations will change, and (when played using [P],[A]) "Greensleeves" will play twice as fast.

Now press [T] and make this entry:

[T]ranspose : /0/8/N1/2/

Then:

[T]ranspose : /0/8/N2/2/

NOTE: Unlike Duration entries, Note entries are independent, and two may be needed as in this example.

NOTE: You may use parts of a previous Transpose entry by pressing the right arrow key and moving the cursor over those characters that are still OK.

Now "Greensleeves" will play one whole step higher in pitch.

Negative numbers may be entered to [T]ranspose:

[T]ranspose : /0/8/N1/-4/

When using [T]ranspose, a change number of 1 will change durations by 50 percent (quarter notes become dotted eighths), and will change notes by a half-step (G becomes G#). A change number of 2 will make durations half or (when -2 is used) twice as long. A change number of 12 will change notes by 1 octave (since there are 12 semitones in an octave).

The Electric Duet is shown on a 5 1/4 inch floppy diskette. The reverse side of the diskette will become damaged if you attempt to use it for five dollars to cover sl

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Due to the diskette protection, the screen will fill with asterisks when saving a player module on a diskette. This is normal and occurs when the diskette has been correctly saved. Since the diskette is used to re-enter the program,

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The solution was to create a high-frequency carrier frequency (14,080 Hz) and control the percentage of time it is turned on. This is called "duty-cycle modulation". In this method, the carrier waveform is turned on a percentage of time based on whether one or the other of the musical note cycles is "on" at the moment. This effectively transmits voltage increments to the speaker or amplifier.

Note 1    Note 2    Speaker Duty Cycle

OFF	OFF	0
OFF	ON	50
ON	OFF	50
ON	ON	90

The described increments are controlled by counters containing numbers between 8 and 256. The carrier frequency of 14,080 Hz was selected for its musical importance:

$14,080 / 32 = 440$  (middle A)

Therefore a pitch number of 32 gives A440.

Another refinement was "voicing", to increase the tonal range of the music. This is also accomplished by duty-cycle modulation, but at a much lower frequency. If a voice of 1 is selected, the generated musical tone has a duty cycle of 50 percent, voice 2 has 25 percent and so forth. If a voice number of 8 or greater is selected, the tone drops an octave in pitch, creating a "phantom octave" for a total of 6 octaves (5 1/2 of which are usable for normal music).

## Electric Duet

The carrier frequency may be audible in some circumstances, although it is out of the hearing range of most of the population. When an amplifier is used, excessive stereo treble settings may bring it out.

### Music File Internal Format

Each file entry consists of three bytes:

Byte 1 = duration. Normal range 2 - 255.

If Byte 1 = 0, it marks the file end.

If Byte 1 = 1, this indicates that bytes 2 and 3 are voice rather than note specifiers. Bytes 2 and 3 both must be note or voice specifiers.

Bytes 2 and 3 = note values for notes 1 and 2

Normal range of values 1 - 255.

If Byte 2 or 3 = 0, a rest is "played".

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